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First Named Inventor	Christopher D. Eckhoff
Art Unit	2614
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  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
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Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Davis & Associates		
Signature	William D. Davis		
Printed name	William D. Davis		
Date	March 10, 2008	Reg. No.	38,428

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75622.P0048 Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:

Christopher D. Eckhoff

Application No: 09/977,875

Filed: October 15, 2001

For: SUBSCRIBER LINE INTERFACE CIRCUITRY WITH MODIFIED DC FEED

Examiner: Jamal, Alexander

Art Unit: 2614

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Reply Brief Under 37 C.F.R. § 41.41

Applicant (Appellant) respectfully submits this Reply Brief in response to The Examiner's Answer mailed on January 09, 2008.

The Brief is nominally required to be filed within two months from the date of mailing of the Examiner's Answer or March 09, 2008. However, given that March 09, 2008 fell on a Saturday, Sunday, or Federal holiday, appellant submits that this Brief is timely filed when mailed on or before MARCH 10, 2008 as indicated by the above certificate of mailing.

REMARKS

Appellant addresses each of the Examiner's "bolded" points introduced in the Examiner's Answer.

Note: Appellant has previously requested that the Amendment After Final be acted upon. The Amendment should be entered or denied entry.

(1)-(8) With respect to bold points 1-8 in the Examiner's Answer, Appellant agrees.

(9) With respect to bold point 9, the appellant disagrees at least in part. The Examiner began renumbering the items under 9 starting with "1". Appellant will address the subpoints of point 9 as "9.1, 9.2" etc. rather than "1, 2" for clarification.

(9.1) Point 9.1 identifies all the subpoints as 35 U.S.C. § 103 rejections. Appellant addresses the subpoints below.

(9.2) Claims 1, 2, and 13 were rejected under 35 U.S.C. § 103 over U.S. Patent No. 5,619,567 of Apfel ("Apfel") in view of U.S. Patent No. 6,665,398 of Ludeman ("Ludeman"). The Appellant disagrees with the Examiner's characterization of Ludeman or at least the suggestion that modification of Apfel would be so readily accomplished or even suggested by Ludeman.

Apfel teaches a SLIC having a hysteresis loop in its I-V characteristic curve. (see, e.g., Apfel Fig. 4, also element 313 of Fig 3). Ludeman teaches an entirely different characteristic curve that has no hysteresis (see, e.g., Ludeman Fig. 6). Appellant submits that the "motivation" of Ludeman did not teach the use of hysteresis but rather a segmented characteristic curve *without hysteresis*.

In short, one cannot so readily combine Ludeman because Ludeman would replace the hysteresis characteristic curve of Apfel with the non-hysteresis characteristic curve of Ludeman rather than adopting some characteristic of Ludeman's curve to Apfel. This would be inconsistent with the purpose of Apfel. The hysteresis approach taught by Apfel is an alternative solution to the problems taught by Ludeman. The "instability" around the switching point problem would not exist because the characteristic curve with hysteresis takes into account the state that the SLIC is switching from.

The Examiner's proposal to preserve Apfel's hysteresis and provide for different "transition from" current thresholds would appear to be self-defeating since Apfel teaches the simplicity of using one "hook switch" detector coupled with hysteresis. The modifications that would need to be made to Apfel would be considerably more complicated than what is proposed by the Examiner.

Consider for example, that Apfel's hook-switch detector is a binary decision device that determines "on hook" or "off hook" based upon the relationship between the sensed loop current and a single current threshold. Accordingly although there are two switching points, they shared a common current threshold such that voltage was irrelevant. If Apfel's characteristic curve is modified as proposed by the Examiner, then Apfel's "hook-switch" detector must likewise be modified. There are at least two possibilities for modification.

One possibility is that there is a single hook-switch detector that would be associated exclusively with only one of the modified switching points. Does the Examiner propose using a single hook-switch detector, and if so, then 1) which of the current thresholds points will the hook-switch detector be associated with, 2) why, and 3) where is the motivation for that solution found in either Apfel or Ludeman? Also, would the answer be same regardless of whether Apfel's characteristic curves were such that $I_B<I_E$ or $I_B>I_E$ (where I_B and I_E are the loop currents associated with points B and E of Apfel.)? Finally, consider whether Apfel would work properly after such a modification.

Another possibility is that there are multiple hook-switch detectors each associated with a different current threshold. The binary results of all the detectors must be collectively examined in light of the prior state of the SLIC in order to determine whether the SLIC should recognize a state change and which state it is switching to. Does the Examiner propose expanding Apfel to provide an hook-switch detector for *each* switching point such that the hook state now depends upon which direction one is traveling along the I-V characteristic curve? This solution would require additional logic for the hook-switch detector(s) to provide a resulting binary "yes/no" to the SLIC. If this is the approach, then 1) what is the proposed logic/state diagram for interpreting the multiple threshold detectors to conclude whether one is "off-hook" or "on-hook", 2) why, and 3) where is the motivation for this solution found in either Apfel or Ludeman?

Appellant disagrees with the Examiner's simplistic conclusion of motivation for the proposed modification and submits that such a modification 1) teaches away from Apfel, 2) would render Apfel unworkable certainly without other significant modifications, and 3) is not suggested by any of the cited references.

Appellant submits that the Examiner's proposed modification could not be made in the absence of additional modifications such as those mentioned above. The Examiner failed to address the additional modifications that would be necessitated by the proposed modifications, yet such additional modifications would be necessary to preserve the functionality of the SLIC generally - not to mention retaining some consistency with the teachings of Apfel. Appellant submits that there cannot be any suggestion from Ludeman unless all the accompanying additional modifications were likewise suggested by Ludeman or are reasonably suggested by the references. The Examiner's failure to address these additional modifications suggests that one skilled in the art could not have been motivated to modify Apfel as claimed. Certainly there is no suggestion within Ludeman as to how to make these changes. At best, the "motivation"

would have been to select between Ludeman or Apfel as mutually exclusive approaches..

Appellant refers the Board to the Appeal Brief for further discussion of the patentability of these claims under 35 U.S.C. § 103.

(9.3) Claims 3-5, 14, 16 were rejected under 35 U.S.C. § 103 over Apfel in view of Ludeman. Appellant submits that these claims depend from independent claims 1 or 13. If claims 1 and 13 are patentable under 35 U.S.C. § 103 then these dependent claims must likewise be patentable under 35 U.S.C. § 103.

Appellant refers the Board to the Appeal Brief for further discussion of the patentability of these claims under 35 U.S.C. § 103.

(9.4) Claims 6-9 were rejected under 35 U.S.C. § 103 over Apfel in view of Ludeman and Zhou. Zhou, however, was only provided for teaching "programmable registers" and did not resolve the deficiencies of Apfel and Ludeman. Appellant submits that these claims are patentable under 35 U.S.C. § 103 for the same reasons argued above with respect to claims 1, 13. If claim 6 is patentable under 35 U.S.C. § 103 then these dependent claims must likewise be patentable under 35 U.S.C. § 103.

(9.5) Claims 10-12 and 15 were rejected under 35 U.S.C. § 103 over Apfel in view of Ludeman and Zhou as applied to claims 6, 9, and 13. Appellant submits that Zhou was only provided for teaching "programmable registers" and was not cited as a basis for rejecting independent claim 13. Zhou, however, was only provided for teaching "programmable registers" and did not resolve the deficiencies of Apfel and Ludeman. Given that claims 10-12 depend from claim 6 and that claim 15 depends from independent claim 13, appellant submits claims 10-12 and 15 are patentable under 35 U.S.C. § 103 if claims 6 and 13 are found patentable under 35 U.S.C. § 103.

Appellant refers the Board to the Appeal Brief for further discussion of the patentability of these claims under 35 U.S.C. § 103.

(10) Response to Argument

The Examiner has stated:

> The only differences between appellant's Fig. 3 and Apfel's Fig. 4 are the lack of two distinct current thresholds and the fact that Apfel does not specifically label points E and B and 'threshold voltage'.

(Examiners Answer, p. 7)

Appellant submits that the lack of two distinct current thresholds is a critical distinction not to be trivialized. Appellant also submits that this is not the only distinction because the current thresholds are paired with voltage thresholds to form (I,V) switching points and that appellant's claim language clearly identifies distinct voltage thresholds associated with those current thresholds as well. Whether the Examiner analogizes current to current or to voltage, the Examiner is still left with resolving the other (i.e., voltage or current) of the current-voltage relationship in a manner consistent with appellants claim language.

The Examiner has also stated:

> Apfel switches between a common current threshold, but the loop resistance will be different depending on whether the loop is switching from on-hook to off-hook or it is switching from off-hook to on-hook. As such the loop voltage (voltage threshold) will be different in each case.

(Examiner's Answer, p. 7)

Appellant does not understand the relevance of the Examiner's statement. Apfel teaches two switching points that share the same current threshold. Thus Apfel teaches (V1, I1) and (V2, I2) where $V1 \neq V2$ but $I1=I2$. Appellant teaches (V1, I1) and (V2, I2) where $V1 \neq V2$ and $I1 \neq I2$. The characteristic curves of Apfel and Appellant incorporate hysteresis such that the "transition to" and "transition from" points are distinct (refer to appellants claims). In this context the transition "from" point on a given curve is the point at which a switch occurs to transition to another curve. The transition to point on the other curve is not the point at which a switch occurs from the other curve.

The Examiner has stated:

> As per appellant's arguments that Ludeman does not teach hysteresis and only teaches one characteristic curve (brief: page 7 bottom half), the

> examiner notes that Apfel teaches the two characteristic curves. Ludeman is relied upon to teach having two distinct current thresholds (fig. 6) and provides a valid motivation to implement two distinct current thresholds (as noted in the original rejection). Appellant states that the 'transition to' and 'transition from' point are the same, but that is incorrect. Ludeman Fig 6 shows two distinct transition points at Von (Ish-) and Voff (Ish+). Ludeman specifically states that the advantage of not having the same current threshold (Col 2 lines 10-23)...

(Examiner's Answer, pgs 7-8)

Ludeman teaches a characteristic curve with multiple current thresholds defining segments of the characteristic curve. Ludeman does not teach hysteresis. Moreover, for the reasons argued above, one cannot simply modify Apfel to have different current thresholds without creating a problem for determining when the subscriber equipment is "on hook" or "off hook". Apfel uses a single current detector (and a single threshold) to make this determination. Nowhere has the Examiner indicated what additional modification would be made to Apfel to resolve the problem created by the proposed modification.

Appellant maintains that the "transition to" and "transition from" argument refers to the point transitioned from on one curve and the point transitioned to on the other curve. The transition "from" point is the point at which a "switch" between modes is being made. The transition "to" a first point on the second curve is not the same as the transition "from" point on the second curve, thus the "transition to point" is never the switching point on the second curve (regardless of which curve is selected as the second curve).

Ludeman teaches a single characteristic curve and thus there is no "transition to" or "transition from" different curves.

However, if one views Ludeman as comprising multiple curves because of its segmentation, then one must also agree that the transition to and transition from points between segments is identical. Consider defining Ludeman's segments as follows:

$$SEG = \begin{cases} I \ \ for \ \ i < I_{sh-} \\ II \ \ for \ \ I_{sh-} \le i < I_{sh+} \\ III \ \ for \ \ I_{sh+} \le i < I_{sh+} + I_{oh} \\ IV \ \ for \ \ I_{sh+} + I_{oh} \le i \end{cases}$$

Thus I_{sh-} is the transition to and transition from point for both I and II. There is no distinction between the "transition from" and "transition to" point for a given segment nor is there any distinction between the "transition from" and "transition to points" between connected segments.

The "transition to/from" point for and between I and II is always I_{sh-}.

The "transition to/from" point for and between II and III is always I_{sh+}.

The "transition to/from" point for and between III and IV is always $I_{sh+}+I_{oh}$.

Appellant believes that the Examiner may be confusing the transitioning to/transitioning from language with the switching points? The transition "from" point defines a point on one curve at which one switches from one characteristic curve to another curve. The transition "to" point is the point transitioned to on the other curve. The argument was intended to illustrate that due to hysteresis, the "transitioned to" point is *not* the same as the switching point for transitioning back to the one curve.

In contrast, Apfel and Appellant teach transitioning from one curve to a different curve and the use of hysteresis. Apfel and Appellant teach transitioning from a first point (B) on a first characteristic curve to a first point (C) on a second characteristic curve. Apfel and Appellant teach transitioning from a second point (E) on the second characteristic curve to a second point (F) on the first characteristic curve where B≠C≠E≠F. However, given B=(I_B, V_B) and E=(I_E, V_E), where I_x is the loop current for point x and V_x is the metallic voltage for point x, Apfel also clearly requires $V_B \neq V_E$ and $I_B = I_E$, whereas appellant has clearly claimed $I_B \neq I_E$. (see claim 1, *"wherein the first and second points of each of the first and second characteristic curves are all distinct, wherein the first point of the first characteristic curve and the second point of the second characteristic curve have distinct loop currents"*; see claim 6, "wherein the control circuitry [with hysteresis] switches from a normal mode DC feed following the first characteristic curve to a

modified mode DC feed following the second characteristic curve when $V_M \leq V_{THRESH1}$, wherein V_M is a metallic voltage, wherein the control circuitry switches from the modified mode to the normal mode when $V_M \geq V_{THRESH2}$, wherein $V_{THRESH1} < V_{THRESH2}$, *wherein the switching from the normal mode and the switching from the modified mode occur at distinct loop currents.*"; see claim 13: switching from a normal mode DC feed following a first characteristic curve to a modified mode DC feed following a second characteristic curve when $I_L \geq I_{THL}$, wherein I_L is a subscriber loop current...switching from the modified mode to the normal mode when $I_L \leq I_{THH}$, *wherein I_{THH} and I_{THL} are distinct, wherein switching between modes occurs with hysteresis such that for each characteristic curve the switched-to DC feed point is substantially distinct from the switched-from DC feed point on the same characteristic curve."(emphasis added)*)

Appellant sincerely hopes this clarifies the "transition to/from" arguments and refers the Board to the Appeal Brief for a more detailed discussion of these issues.

CONCLUSION

Appellant refers the Board to the Appeal Brief for a more detailed discussion of any of these points.

If there are any issues that can be resolved by telephone conference, the undersigned representative of the appellant may be contacted at **(512) 858-9910.**

Respectfully submitted,

Date: March 10, 2008

William D. Davis

William D. Davis
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